Parent-Hook: A Child Tracking System based on Cloud URL

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***Abstract*—Child kidnapping, missing child and child harassment are the world-wide problem related child safety. The children of age group 4 to 8 years are innocent and subject to kidnapping in frequent cases. Parents are always worried regarding their children's security mainly when they visit crowded public places and travel in widely physically located places. Number of applications is being developed to guard children in every manner. This paper introduces a Parent-Hook product which is designed for child tracking if the child is lost. The Parent-Hook is a safety band without the sensor or any chip harmful for the children can be put on the whist of the children. This band is easy to carry which is made up of soft cotton webbing with parent contact information with QR Code and Cloud URL.**

Keywords—Parent-Hook, Child Tracking System, Cloud URL, QR Code

I. INTRODUCTION

In India the population is very high and occupy 2nd rank in the list of countries by population [1]. Recently, all over the world, crimes against children are increasing at higher rates and many cases of missing children are reported. Parents are always worried about the possibility of kidnapping their children. Now a days, in many families both parents are working outside for their job. Due to this no one is with their child who can keep him or her under their observation. Parents are always worried regarding their child's safety, especially they need to know "where about him" and want to know whether their baby is safely coming from school to home or not [2]. The security of a child could be identified as the greatest concern for public security agencies. These agencies need to improve their system with the help of modern technologies [3][4]. Technology must be blended to help the parents for their concerns regarding their child. The Smart Cities paradigm clearly takes into account the needs of providing a more favorable environment for children's living and learning, but focusing on this aspect it has also to deal with challenges due to cities complex environments, e.g. many construction sites, a large number of running vehicles, crowded meeting places and complex urbanised localities [5]. Such environment is indeed lacking in safety conditions for children. Children are inherently curious, active, and unaware (or incautious) about dangers in their surroundings. Mobile technology plays an increasingly dominant role in human life. It aids for better communication, in obtaining more accurate and quickness in the field of emergency services. Hence a smart phone has become the basic need of citizens. Now a days 80% of people in the world have smart phones. Smart phones are used by people for different purposes. This paper focuses on one of such important initiatives taken by the authors of this paper in the form of a very useful service using "A Child Tracking System". Today smart phones are the basic need of the users today, these smart phones, providing lots of features which make our life so simple and easier. This paper is focused on a child tracking product name as Parent-Hook. Different researcher work related to this topic is explained in Section 2. The proposed architecture of the system is focused in Section 3. Methodology is suggested in Section 4. Finally, Section 5 presents the results and related discussion.

II. LITERATURE REVIEW

Priti et al. has implemented the system for Student Kidnapping prevention using GSM, GPS and Cell phone technology [6]. This system is useful to track, monitor and stop the Kidnapping of students too. Bader et al. use J2ME applications to provide Location Based Services (LBS) on mobile. The LBS service in this application use Global Positioning System (GPS) as its location provider [7]. Client server system is developed to find the location of family members and alerts are received when family members/ friends are nearby. Php is used for server implementation and MySQL is used for databases. Loganathan et al. has developed a system including geo-fencing campus, a child module and a parent module which focuses on the cases where the children are kidnapped [8]. This project includes a geo-fencing campus, a child module and a parent module [8]. A sensor is used for detecting the child's emotions and child cries. A microcontroller ATMEGA 162 is used with a Global system for mobile communication and Global positioning system module [8]. This helps one to hack and find the child movements [8]. A model is proposed by Gupta et al. for child safety. This model allows its users to track the location of their children on their smart phones. The model also allows children to send a quick message if they feel some threat to their safety. They even can send their current location via Short Message services [9]. Android platform is used for validation of the proposed system. Nandini et al. has developed a smart IoT device for child safety and tracking is developed to help the parents to locate and monitor their children [10]. The proposed system automatically alerts the parents by sending SMS when emergency help is required for the children. The parameters such as touch, temperature and heartbeat of the child are used for parametric analysis and results are plotted for the same. The above system ensures the safety and tracking of children [10]. Tanksale et al. has proposed a system consists of school bus unit, school unit and android application [11]. The School-Bus Unit will note the presence of a child on the bus using RFID. GPS modules

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attached to this unit will track location and bus speed constantly. Various technologies are discussed in Shruthi et al. [12]. The technologies that are supporting the human safety and security systems such as Wearable Sensors, Global Positioning System, Global System for Mobile Communication and fields such as e-health services and location-based services are described in this literature. Maghade et al. has implemented an android application which is used to track the missing children [13]. The android application based on GPS and SMS services in Android mobile [13]. The GPS service is used for tracking the exact location of Child. The GPS and GSM based systems are used to track the location of Child [13]. Al-Mazloum et al. has proposed an Android based solution to aid parents to track their children in real time [14]. Dalip et al. suggested women safety using a tracking system for passengers [15]. In this system a cost-effective Global Positioning System (GPS) and Global System for Mobile communication (GSM) based passenger tracking system inside buses has been introduced. It tracks the passengers by using ticket number and displays location on Google map [15].

III. Functional Specification

Fig. 1, shows working of the child tracking system in the form of a sequence diagram. JSON files are used to provide immediate response to responsible citizens. grammar. The description of the sequence diagram is described as follows.

1) Responsible Citizen->ParentHook.com System: Request for the get kids data, sends kid's data from JSON file instead of traditional Database.

2) Responsible Citizen<--ParentHook.com System: Send immediate JSON response.

3) Responsible Citizen->ParentHook.com System: Request for update to kids Parent.

4) Responsible Citizen<--ParentHook.com System: Request accepted.

5) ParentHook.com System->Database: Get Parent information based on unique ID.

6) Database-->ParentHook.com System: Send Parent information.

7) ParentHook.com System->Parent: Notify to kids Parent via email or SMS.

IV. Methodology

In this application, we require a Parent-Hook for children's and GPS enabled smart phones for parents which are used to track the child's location. The finder of the child can use information embedded on the Parent-Hook with respect to the child found at some site and seems lost. The reason for selecting the android operating system is that now days millions of users are using smart phones. Various stages of proposed system development are discussed as follows.

A. Application Development

Fig. 2, shows the technology used for development of the application, which is divided into three layers as:

1) *Front End:* HTML, CSS, Bootstrap, jQuery
2) *Middle ware:* Php
3) *Backend: MySql*

During the designing of the system, Hypertext Markup Language (HTML), Cascading Style Sheet (CSS), Bootstrap and jQuery are used for graphical user interface designing. Php is used in the middle layer, due to information not overloaded. MySQL is used in the back end for databases.

B. System Model

The base of the child tracking system is the Parent-Hook, which is made up of a modern satin wristband with two adjusters to make them adjustable to your wrist. You can have engraved names, initial, short message or any saying up to 20 characters. Fig. 3 and Fig. 4 shows the information on the band. This is a wonderful personalized gift for Kids or someone your satin wristband love is a great personalized gift for everyone who loves Cloth Label with color. Fig. 5 and Fig. 6 shows the colorful images on the band. This band is not only used for children's but also for the aged people.

C. Working of the System

The working of the system is divided into 3 steps.

Step 1) Someone found your child

Someone found your child, he/she can easily See the ParentHook.Com personalized Wristband, Cloth Label and read detailed information of parent form the band. Fig. 7 shows the parent information like-Parent or Mom Mobile, QR Code, Cloud link, Child friendly design.

Step 2) Make call to you

The finder calls the parent of the children using information obtained from the band.

Step 3) Share Geographical Information

He/She will share GEO Location via "parenthook.com", you will get an email alert your child has been found if you mark child as lost. Fig. 8, Fig. 9 and Fig. 10 shows the information shared by the user and visualization of information. You can see the direction, how to reach the child location using Google Map via ParentHook.com.

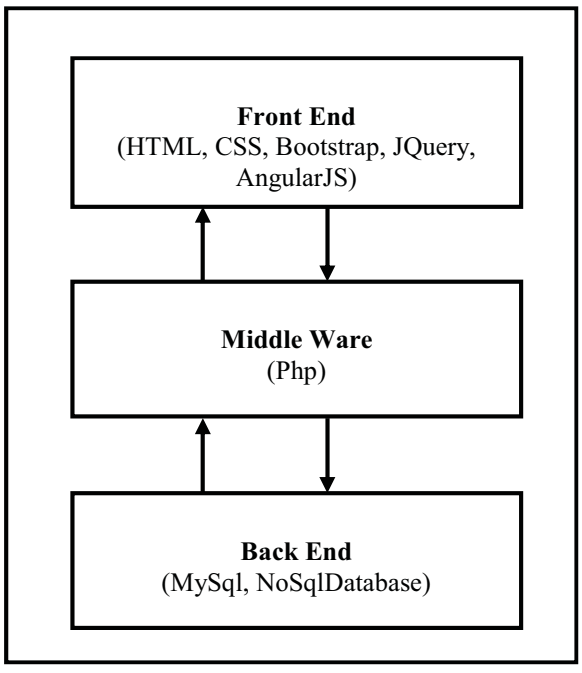

Fig. 2. Technology used for System Designing

Fig. 3. Band with information

Fig. 4. Backside of the band

Fig. 5. Front side of the band

Fig. 6. Full Band

Fig. 7. Band with Geographical Information

Fig. 8. GEO Location Via Parent-Hook

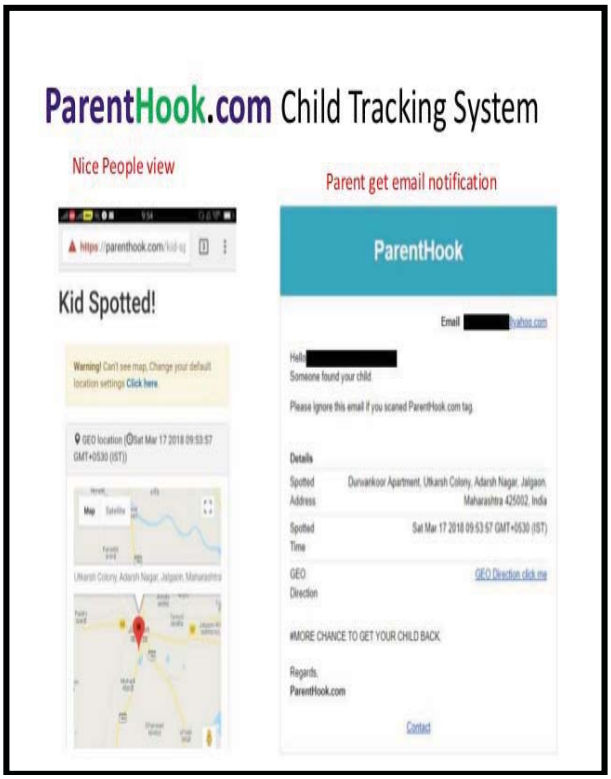

Fig. 9. GUI for Child Tracking System for sharing Information

V. Result and Discussion

Once a child gets up on his feet and starts walking he or she would begin to conquer the whole world. The concern of parents regarding their baby's safety begins from the day their baby puts his first foot on the floor without accessing anybody's help. They have the fear that their baby may walk around and may get lost. The newspapers are full of stories of lost and or found children. Hence to help the people living in

modern society with such fears, the products like "Parent Hook" has become a need. This product is thus developed to help people to track and find their child in case he or she gets lost. The product "Parent-Hook" has been launched as a start-up and has received good response from more than 100 customers. Most of them are the local people in Pune city. This product has earned a few "start-up awards" from various competitions. The band has been tested on many children and has won the trust of their parents. More than 91% of people have given positive feedback regarding the utility of the band. 98% of people have reported no harm from the material of the band. Only 2% people complained about the rashes due to the material. It was investigated further that most of the complaints are from parents of babies with age 2 to 3 years. 95% of the children of age group 4 to 6 have kept their bands on their wrist when they were convinced by saying "how it could protect them" or "how attractive their hand looks". Surprisingly, most of the baby girls were happy to wear the parent hook. On the other side more than 15% boys refused to wear the bands at the beginning due to reasons like "the bands are not for a boy". 75% parents use these bands when they go in public places, market places or are on a vacation trip. 15% parents use the parent hook even when their child goes to the babysitter or in nursery school. 10% parents let the band be attached with the baby even when he plays around their home. Table 1 presents summary of above-mentioned discussion. Fig. 11 shows its graphical representation of feedback received from different customers. Most important suggestion is to make the system real time respondent. Another is to make the changes to allow the people to keep some part of the parent hook tag invisible from the people so that if the child is not lost but gets stolen from a public place that tracking should start.

Fig. 10. GUI for Child Tracking System for Parent

TABLE 1. FEEDBACK OF PRODUCT FOR CUSTOMERS

Sr. No.	Topics	Results from customers	Accuracy
1)	Feedback about the product	Positive Feedback	91%
		Negative Feedback	09%
2)	Material used in Product	Positive Feedback	98%
		Negative Feedback	02%
3)	Band used by Children's	Accepted	95%
		Refuse	05%
4)	Look and feel of band accepted	Girl's	95%
		Boy's	75%
5)	Utilization of band by parents	Public places	75%
		School	15%
		Playing around the home	10%

VI. CONCLUSION

Many sites are being developed to upload the information of finding a lost child. For this we need to remove the entire traditional database and use the JSON file that will allow us to link up the information available on other sites. The information available on other sites could be matched with the data of a lost child to generate alerts that could be received by respective parties. For security purposes we will use a user defined data encryption and tagging system. The future enhancement will be done to overcome various issues like auto calling to responsible persons if the system detects that the child is lost. The symptoms reflected by the bodies of the lost child and the person who is around him could be sensed by the technological updates in the "Parent-Hook" product.

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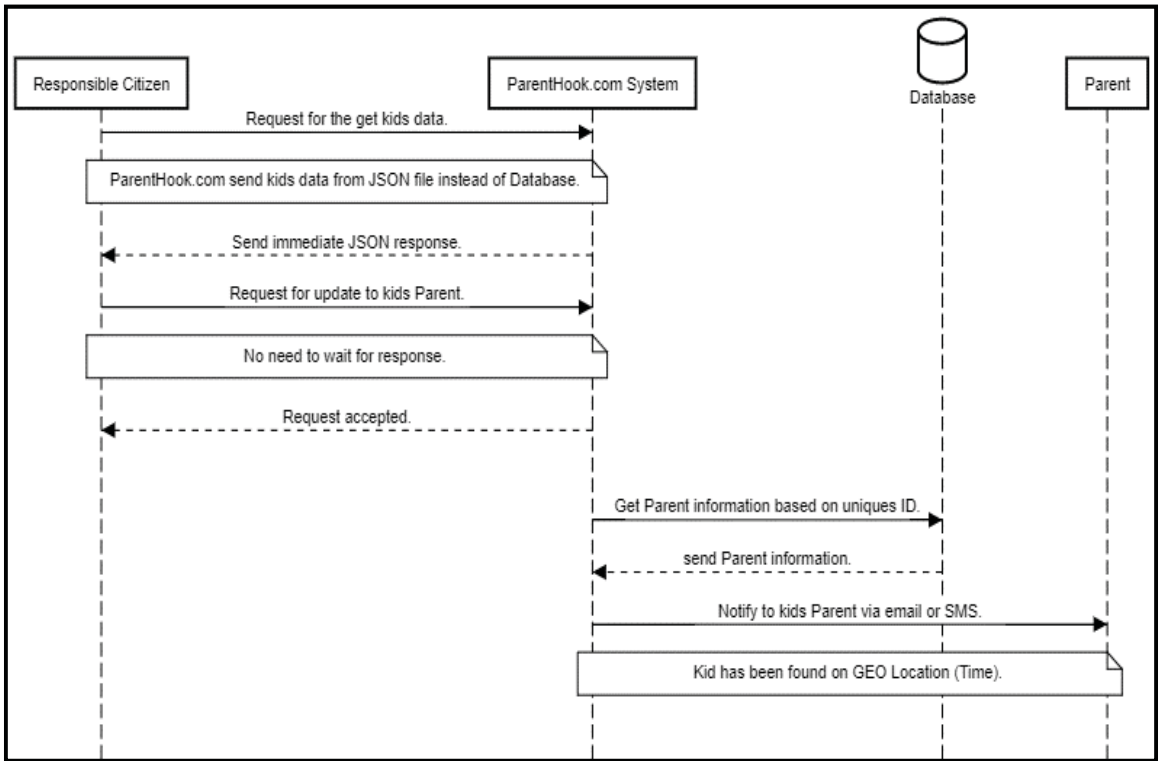

Fig. 1. Sequence Diagram

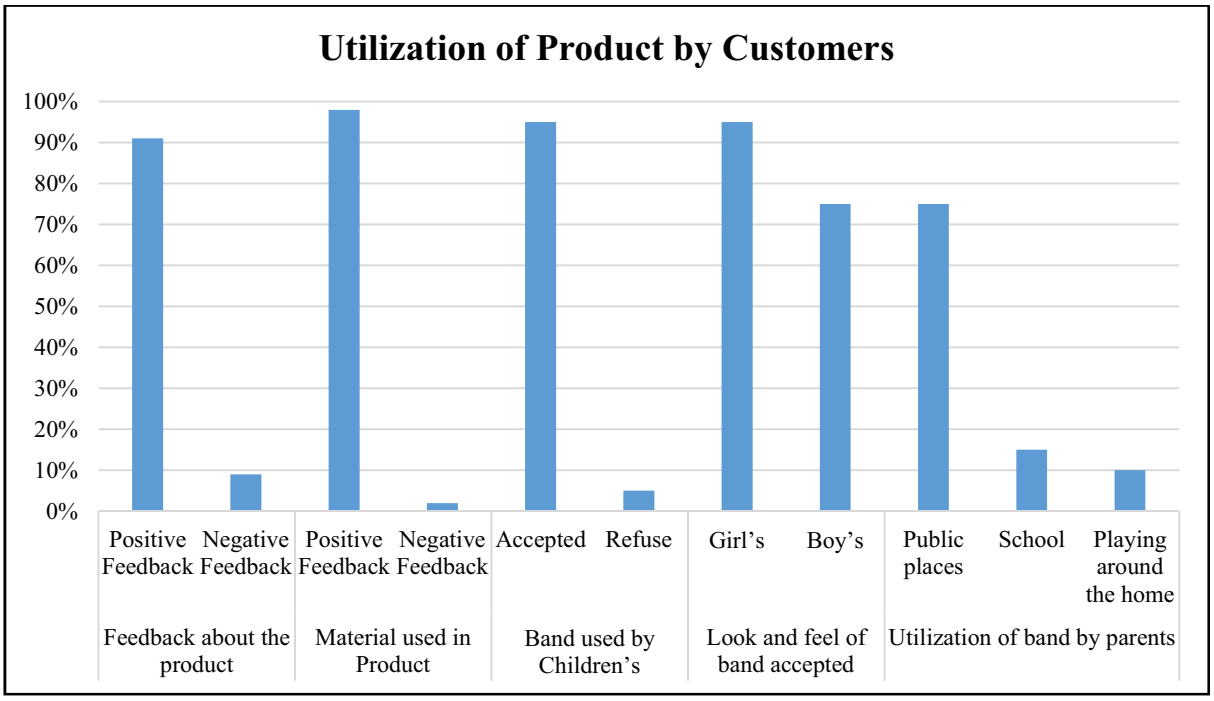

Fig. 11. Utilization of the Product by Customers